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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,008

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Naoto Hirotsaki

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EXAMINER

HANOR, SERENA L

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,008	Applicant(s) HIROSAKI ET AL.	
	Examiner SERENA L. HANOR	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-8 and 10-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12, 13 and 19 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8, 10, 11, 14-18 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/19/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The person having ordinary skill in the art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

Claims 1-3, 5-8, 10, 11, 14-18 and 20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kohtoku et al. (U.S. Patent No. 4,845,059) in view of Thebault et al. (U.S. Patent No. 5,411,762).

Kohtoku et al. disclose a production method of an oxynitride powder, comprising applying a heat treatment in a reducing and nitriding atmosphere, which includes at least an ammonia gas (col. 4 lines 24-45, *Applicants' claim 14*), to a precursor compound including nitrogen (col. 2 lines 25-45, *Applicants' claim 2*) and M, Si, Al, and O, where M is selected from Li, Mg, Ca, Sr, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, or Lu or any combination thereof, but preferably at least includes Ca or Eu (col. 2 lines 47-64, *Applicants' claims 17 and 18*), thereby decreasing the oxygen content and increasing the nitrogen content of the precursor (*Applicants' claims 1 and 8*) in order to produce an α -sialon represented by the general formula (col. 3 lines 26-40, *Applicants' claim 3*): $M_x Si_{12-(m+n)} Al_{m+n} O_n N_{16-n}$ ($0 \leq x \leq 2$, $0 < m \leq 6$, and $0 \leq n \leq 3$).

The precursor compound is a mixture of:

a) SiX (silicon dioxide, silicon oxynitride, silicon nitride or any combination thereof), which turns into silicon dioxide, silicon oxynitride, or silicon nitride by heating (col. 2

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lines 1-36 and 65-68, *Applicants' claims 1, 5 and 8*), which has an averaged particle size of 2 microns or less (col. 4 lines 46-50, *Applicants' claim 1*);

b) MX (oxide, hydroxide, alkoxide, carbonate, nitrate, chloride or any combination thereof of M), which turns into an oxide, oxynitride, or nitride of M by heating (col. 2 lines 1-21 and 37-64, *Applicants' claims 1, 6 and 8*); and

c) AlX (oxide, hydroxide, alkoxide, carbonate, nitrate, chloride or any combination thereof of Al), which turns into aluminum oxide, aluminum oxynitride, or aluminum nitride by heating (col. 2 lines 1-45, col. 3 lines 1-8, *Applicants' claims 1, 7 and 8*).

Said mixture is obtained by dispersing SiX particles in a solution including MX and AlX followed by drying and desolvation, wherein the M and Al compounds are attached to a surface of a SiX particle (col. 4 lines 6-11, *Applicants' claims 10 and 11*).

The obtained oxynitride powder is an α -sialon powder represented by the following formula (col. 3 lines 26-40, *Applicants' claim 20*):

$\text{Ca}_{x1} \text{Eu}_{x2} \text{Si}_{12-(m+n)} \text{Al}_{m+n} \text{O}_n \text{N}_{16-n}$, where:

$0.4 \leq x1 \leq 1.5$ $0.01 \leq x2 \leq 0.4$ $0.8 \leq m \leq 3$ $0 \leq n \leq 2$.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted). See MPEP 2113 [R-1]. *Applicants' claim 20*.

Kohtoku et al. differ from the instant invention in that it does not disclose the particle size of the SiX precursor compound.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have expected** the process of Kohtoku et al. to use an SiX precursor compound with a particle size of 2 microns or less, as per Applicants' claim 1, **because** "[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). See MPEP 2112 [R-3] I. Applicants disclose that the size of the SiX precursor particle determines the size of the α -sialon particle (p. 12 [0056-0057] of Applicants' Specification). In other words, because the process of Kohtoku et al. in view of Thebault et al. presents a *prima facie* case of obviousness, it would be reasonable to expect that the SiX particle size could be less than 2 microns, since the α -sialon particle size disclosed in Kohtoku et al. could be less than 2 microns.

Kohtoku et al. do not disclose that the MX particles and AlX particles have averaged particle sizes smaller than that of SiX particles.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have expected** the process of Kohtoku et al. to use MX and AlX precursor compounds with particle sizes smaller than that of the SiX particles, as per Applicants' claim 8, **because** "[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*,

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190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). See MPEP 2112 [R-3]

I. Applicants disclose that the size of the SiX precursor particle determines the size of the α -sialon particle (p. 12 [0056-0057] of Applicants' Specification). In other words, because the process of Kohtoku et al. in view of Thebault et al. presents a *prima facie* case of obviousness, it would be reasonable to expect that the MX and AlX particle sizes could be smaller than the SiX particle size, since the SiX particles determines the α -sialon particle size, so therefore the MX and AlX particle sizes would not affect the α -sialon particle size, so therefore they must be smaller than the SiX particle size.

Kohtoku et al. differ from the instant invention in that the ranges of x, x1, x2, m, and n are overlapping and/or lie within the disclosed ranges of the instant invention.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have selected** values from Kohtoku et al. also disclosed by the instant invention, as per Applicants' claims 3, 19 and 20, **because** a prima facie case of obviousness exists in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art". *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Furthermore, "[A] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." *In re Peterson*, 315 F.3d 1325, 1330, 65 USPQ2d 1379, 1382-83 (Fed. Cir. 2003). See MPEP 2144.05 [R-5].

Kohtoku et al. differs from the instant invention in that it does not specifically disclose the M and Al compounds as being attached to a surface of a SiX particle.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have known** *that the M and Al compounds would be attached to the surfaces of the SiX particles*, as per Applicants' claims 10 and 11, **because** it is known that the particles in powder form are in the form of a matrix with SiX particles being the host in the matrix, thus the known definition of a sialon powder. "[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). See MPEP 2112 [R-3] I.

Kohtoku et al. differs from the instant invention in that it does not disclose the order of mixing SiX, MX, and AlX in a solution.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have selectively dispersed** *the SiX into a solution of a mixture of MX and AlX*, as per Applicants' claim 11, **because** the selection of any order of mixing ingredients is prima facie obvious. See *Ex parte Rubin*, 128 USPQ 440 (Bd. App. 1959), *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946), and *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930). See MPEP 2144.04 [R-6] IV C.

Kohtoku et al. differs from the instant invention in that it discloses simply removing the solvent from the mixture of SiX, MX, and AlX.

It would have obvious to one of ordinary skill in the art at the time of the invention **to have recognized** *that the step of removing the solvent involves drying and/or desolvation*, as per Applicants' claim 11, **because** "[e]xpress suggestion to substitute

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one equivalent for another need not be present to render such substitution obvious." *In re Fout*, 675 F.2d 301, 213 USPQ 532 (CCPA 1982). See MPEP 2143 B Example 1.

Thebault et al. disclose a process of making a sialon-based material by applying a heat treatment in a reducing and nitriding atmosphere (col. 3 lines 5-15), which includes at least an ammonia gas (col. 1 lines 66-68, col. 2 lines 9-14 and 43-47, *Applicants' claim 14*) or a mixed gas atmosphere of ammonia and hydrocarbon (col. 2 lines 43-47, *Applicants' claim 15*), wherein the hydrocarbon gas is methane or propane (col. 2 lines 43-52, *Applicants' claim 16*).

It would have been obvious to one of ordinary skill in the art at the time of the invention **to have modified** *the process of van Krevel et al. by using an atmosphere comprising ammonia gas and a hydrocarbon gas such as methane*, as per Thebault et al. (col. 1 lines 66-68, col. 2 lines 9-14 and 43-52, col. 3 lines 5-15), as per Applicants' claims 14-16, **because** of the stated advantage that the presence of a gaseous carbon compound in a nitrogen gas atmosphere, or ammonia, since it is known that ammonia gas decomposes to nitrogen gas, is necessary for obtaining a product comprising sialon (Thebault et al., col. 2 lines 55-58), as per Applicants' claim 1.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 5-8 and 10-20 have been considered but are moot in view of the new ground(s) of rejection.

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Applicant did not address the prior art rejections or how the amendments overcame the prior art rejections.

Conclusion

Claims 1-3, 5-8, 10, 11, 14-18 and 20 have been rejected.

Claims 12, 13 and 19 have not been rejected under either 35 U.S.C. 102 or 35 U.S.C. 103 because the limitations of these claims are not taught in the reference(s) of record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SERENA L. HANOR whose telephone number is (571)270-3593. The examiner can normally be reached on Monday - Thursday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SLH

/Timothy C Vanoy/

Primary Examiner, Art Unit 1793